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# How to Reduce Decay in High-Value Hardwood Trees



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# How to Reduce Decay in High-Value Hardwood Trees [ ],

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Decay fungi cause about 80 percent of all volume loss due to disease in high-value hardwood trees. Even though there is an overall surplus of hardwoods, demand for the preferred high-value species—used in furniture, paneling, flooring, cabinets, and other products—equals or exceeds their growth. Decay reduces the amount of hardwood available for these products, but fortunately, much of this loss can be prevented by proper forest management and cultural practices.

## The Decay Process

Fungi are the major cause of decay in trees, although bacteria and yeasts are often involved in the decay process, too. Decay fungi cause top rot, trunk rot, butt rot, and root rot and can destroy both heartwood and sapwood (Fig. 1).

Decay fungi are spread by tiny spores produced by fungus fruiting bodies called “conks” (Fig. 2). Most fungi



Figure 1. — Heartrot in scarlet oak.

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Figure 2. — Fruiting bodies of the shoestring root and butt rot fungus *Armillariella mellea*.



Figure 3. — *Eutypella* canker on sugar maple.



can become established and cause damage only if they can enter the tree through a wound. Spores spread by wind and rain land on wounds caused by fire, weather, man, animals, insects, or natural pruning and begin to grow.

Decay usually extends only into wood that was present at the time of injury. Thus, the larger the tree at the time of wounding, the greater the potential volume loss.

Conks indicate advanced decay; other indications of decay are butt and stem bulges, butt scars, rotten branches, seams, burls, cankers, (Fig. 3) frost cracks, basal cracks, and large holes. The amount of decay associated with them varies.

## How Decay Enters Trees

Fire is the major cause of wounds through which decay fungi enter. Fire damage on the butts of trees provides favorable sites for decay fungi to enter and grow (Fig. 4). Because most of the volume and value of a hardwood tree is in the butt log, these wounds seriously affect the value of the tree.

Frost cracks, logging scars, lightning scars, and dead and broken branches and tops are other important entry points for decay fungi.

Stump sprouting is the primary means by which cutover hardwood stands regenerate. Frequently many sprouts originate from a single parent stump. When sprouts larger than 2 inches in diameter are removed in thinning to reduce the number of stems in sprout clumps, heartwood is often exposed and the wounds are slow to heal, allowing decay to start in the remaining sprouts. Tree species vary in their sprouting habits and susceptibility to decay from different types of wounding.

## Reducing Decay

Although it is impossible to eliminate decay completely, stands can be managed to reduce decay by preventing wounds, thinning sprout stands properly, and using timber stand improvement techniques.





Figure 4. — A fire-scarred black oak.

*Wounds can be prevented by:*

1. Protecting stands from fire
2. Reducing logging wounds by better design of skid trails, reducing felling damage, and harvesting damaged residual trees
3. Pruning only live branches that are less than 2 inches in diameter (these wounds heal rapidly)
4. Maintaining stocking levels to encourage self-pruning and rapid closure of wounds.

*Proper handling of sprout stands includes:*

1. Favoring seedlings, seedling sprouts, or sprouts of desirable origin from small, decay-free stumps
2. Removing excess stems in sprout clumps when stands are young — generally less than 20 years old
3. Favoring sprouts of low origin on the stump over those of high origin.



*Proper timber stand improvement techniques include:*

1. Removing trees with extensive fire wounds
2. Removing cull, conky, scarred, or root-diseased trees
3. Avoiding thinning in the spring when bark is knocked off more easily.

## Conclusion

Since decay fungi enter trees primarily through branch stubs and wounds, control efforts should be aimed at minimizing these entry courts. Wounds at the soil line are particularly susceptible to infection. The spread of decay within trees is affected by tree species, age, diameter, site, climate, size of wound, type of fungus, host vigor and decay resistance, and the presence of insects and other fungi. Preventing decay and reducing its prevalence in existing stands are important for higher quality hardwoods.

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For additional information see: Agriculture Handbook No. 595, Reducing Decay Losses in High Value Hardwoods — A Guide for Woodland Owners and Managers, by Frederick H. Berry. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402. Price \$2.75. Stock No. 001-000-04276-9.

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Cover photo: A fire-scarred black oak cut lengthwise to show decay in trunk.

